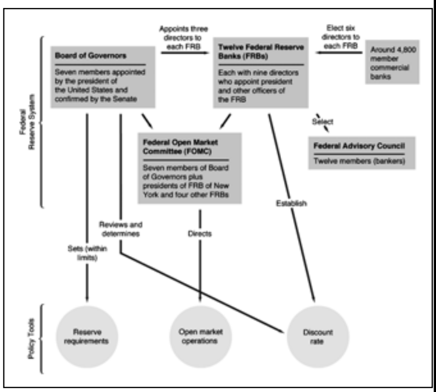
Review Final Exam

Chapters 14, 15, 16, 17, 18, 22, 25 and 26

CHAPTER 14

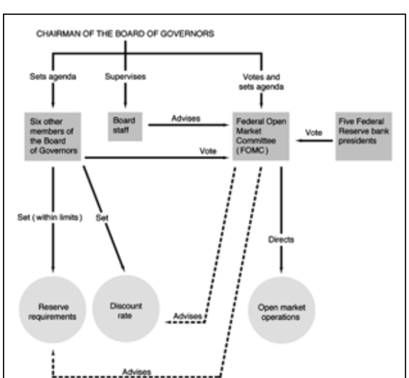
Structure of Central Banks
and the Federal Reserve System

Formal Structure of the Fed



Federal Reserve Districts

Informal Structure of the Fed



CHAPTER 15

Multiple Deposit Creation and the Money Supply Process

Four Players in the Money Supply Process

1. Central bank: the Fed
2. Banks
3. Depositors
4. Borrowers from banks

Federal Reserve System

1. Conducts monetary policy
2. Clears checks
3. Regulates banks

The Fed's Balance Sheet

Federal Reserve System

Assets	(Monetary) Liabilities
Government securities	Currency in circulation
Discount loans	Reserves

Monetary Base (high powered money): MB = C + R

Deposit Multiplier

Simple Deposit Multiplier

$$\Delta D = \frac{1}{r} \times \Delta R$$

Deriving the formula

$R = RR = r \times D$

$$D = \frac{1}{r} \times R$$

$$\Delta D = \frac{1}{r} \times \Delta R$$

CHAPTER 16

Determinants of the Money Supply

Money Multiplier (Money is M1)

$M = m \times MB$

m is function of Depositors, Banks and Reserve Requirements

m > 1 [multiplier]

C is desired level of currency

Let c = C/D = Currency ratio

Let e = ER/D = Excess reserve ratio

$$M = \frac{1 + c}{r + e + c} \times MB$$

$$m = \frac{1 + c(\text{-}ve)}{r\,(\text{-ve}) + e(\text{-}ve) + c(\text{-}ve)}$$

Full Model

$M = m \times (MB_n + DL) = m$ x *(Nonborrowed MB + Discount Loans)*

Full Model

$M = m \times (MB_n + DL)$

$= m \times (\text{Nonborrowed } MB + \text{Discount Loans})$

Banks also influence the amount of discount loans

Split MB into 2 components: one that is controlled by the Fed and another that is less controlled.

$MB = MB_n + DL$

$= \text{controlled by Fed by open market} + \text{Discount Loans}$

Factors Determining Money Supply

SUMMARY **Table 1 Money Supply (M1) Response**

Player	Variable	Change in Variable	Money Supply Response	Reason
Federal Reserve System	r	↑	↓	Less multiple deposit expansion
	MB_n	↑	↑	More MB to support D and C
	DL	↑	↑	More MB to support D and C
Depositors	c	↑	↓	Less multiple deposit expansion
Depositors and banks	Expected deposit outflows	↑	↓	e ↑ so fewer reserves to support D
Borrowers from banks and the other three players	i	↑	↑	e ↓ so more reserves to support D

Note: Only increases (↑) in the variables are shown. The effects of decreases on the money supply would be the opposite of those indicated in the "Money Supply Response" column.

CHAPTER 17

Tools of Monetary Policy

Fed tools

1. Open Market Operations
   1. change reserves and monetary base
2. Discount Rate
   1. change the monetary base
3. Reserve Requirements
   1. change the money multiplier

Plan:

how do they change the Fed funds rate using supply-demand analysis of the reserves market (where the Fed funds rate is determined).

Fed Funds rate: interest rate on overnight loans of reserves from one bank to another

The Market for Reserves and the Fed Funds Rate

Demand Curve for Reserves R^d

1. $R = RR + ER$
2. $i \downarrow$, opportunity cost of $ER \downarrow$, $ER \uparrow$
3. Demand curve R^d slopes down

Supply Curve for Reserves R^s

1. R^s = *OMO non-borrowed reserves* R_n + *Discount loans*

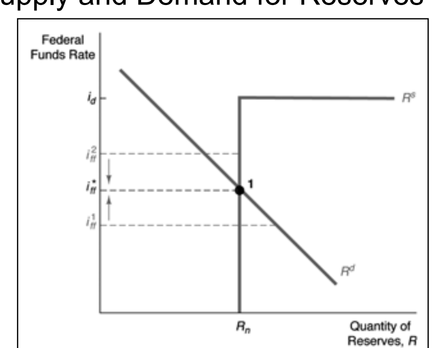
If i_{ff} is below i_d, then discount borrowing, $R^s = R_n$

2. Supply curve flat (infinitely elastic) at i_d because as i_{ff} starts to go above i_d, banks borrow more at i_d

Market Equilibrium

$R^d = R^s$ at i^*_{ff}

Supply and Demand for Reserves

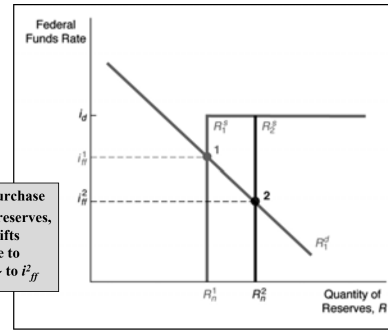


Fed tools

1. Open Market Operations
2. Discount Rate
3. Reserve Requirements

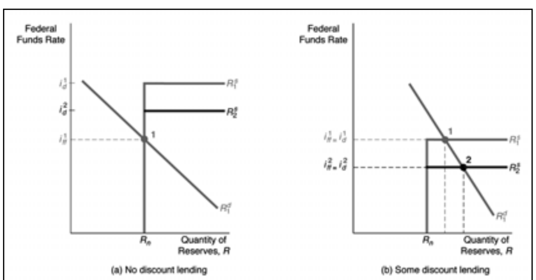
How do they change the Fed funds rate?

Response to Open Market Operations



Open Market Purchase
Nonborrowed reserves, R^n, ↑ and shifts supply curve to right R^s_2: i ↓ to i^2_{ff}

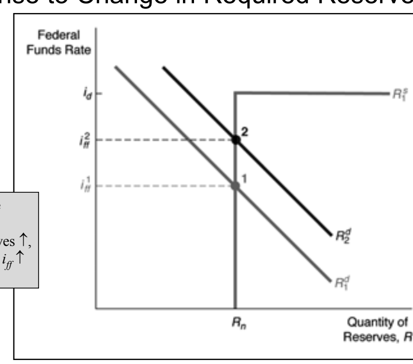
Response to a Change in the Discount Rate



(a) No discount lending **Lower Discount Rate**
Horizontal to section ↓ and supply curve just shortens, i_{ff} stays same

(b) Some discount lending
Lower Discount Rate
Horizontal section ↓, i_{ff} ↓ to $i^2_{ff} = i^2_d$

Response to Change in Required Reserves



Required reserve Requirement ↑
Demand for reserves ↑, R^d shifts right and i_{ff} ↑ to i^2_{ff}

CHAPTER 18

Conduct of Monetary Policy: Goals and Targets

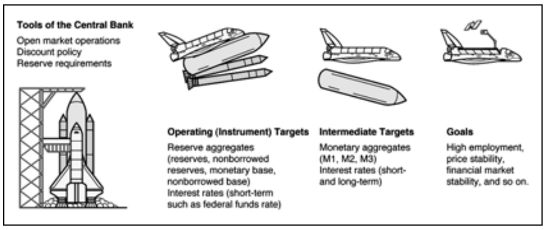
Goals of Monetary Policy

Goals

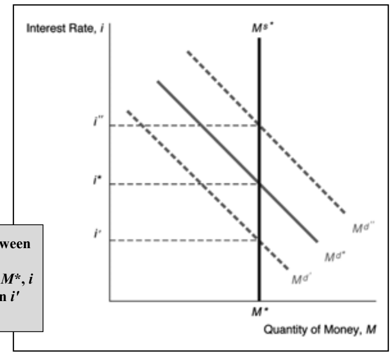
1. High Employment
2. Economic Growth
3. Price Stability
4. Interest Rate Stability
5. Financial Market Stability
6. Foreign Exchange Market Stability

Goals often in conflict

Central Bank Strategy

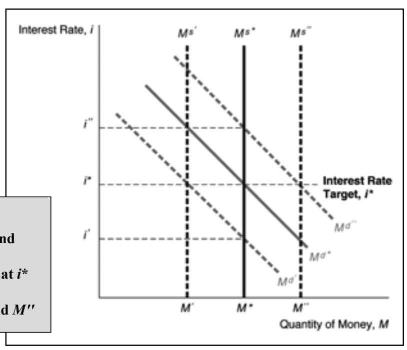


Money Supply Target



1. M^d fluctuates between $M^{d'}$ and $M^{d''}$
2. With M-target at M^*, i fluctuates between i' and i''

Interest Rate Target



1. M^d fluctuates between $M^{d'}$ and $M^{d''}$
2. To set i-target at i^* M^s fluctuates between M' and M''

CHAPTER 22

The Demand for Money

Quantity Theory of Money

Velocity

$$V = \frac{P \times Y}{M}$$

Equation of Exchange $M \times V = P \times Y$

Quantity Theory of Money

1. Irving Fisher's view: V is fairly constant
2. Equation of exchange no longer identity
3. Nominal income, PY, determined by M
4. Classicals assume Y fairly constant
5. P determined by M

Quantity Theory of Money Demand

$$M = \frac{1}{V} \times \text{PY}$$

$$M^d = k \times PY$$

Implication: interest rates not important to M^d

Keynes's Liquidity Preference Theory

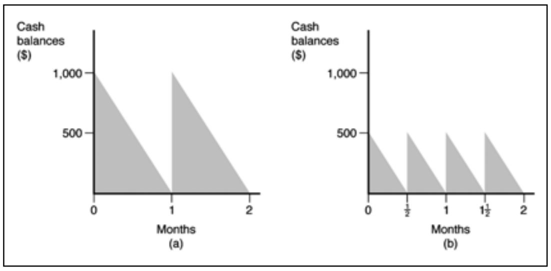
3 Motives

1. Transactions motive—related to Y
2. Precautionary motive—related to Y
3. Speculative motive
   A. related to W and Y
   B. negatively related to i

Liquidity Preference

$$\frac{M^d}{P} = f(\underset{-}{i}, \underset{+}{Y})$$

Cash Balance in Baumol-Tobin Model



Implications of Money Demand Theories

Keynes

M demand is very sensitive to i

Velocity is not constant (unpredictable b/c M demand is unstable)

M policy has little effect on i

Friedman

M demand is insensitive to i

Velocity is constant (predictable)

M policy determines Aggregate Spending (Q-Theory)

CHAPTER 25

Aggregate Demand and Supply Analysis

Monetarist View of AD

$$V = \frac{P \times Y}{M} = \frac{2000}{1000} = 2$$

Modern Quantity Theory of Money

$M \times V = P \times Y$

Implication: M determines $P \times Y$ if V unrelated to ΔM

Deriving *AD* Curve

$M = 1000$, $V = 2 \Rightarrow P \times Y = 2000$

Point A:	$P = 2$	$Y = 1000$	$PY = 2 \times 1000$
Point B:	$P = 1$	$Y = 2000$	$PY = 1 \times 2000$
Point C:	$P = .5$	$Y = 4000$	$PY = .5 \times 4000$

Conclusion: $P\downarrow$ $Y\uparrow$, downward sloping AD

Shift in *AD* Curve

$M\uparrow$: $P{\times}Y\uparrow$, so at given P, $Y\uparrow \Rightarrow AD$ shifts right

Keynesian View of *AD*

$Y^{ad} = C + I + G + NX$

Downward Sloping *AD*

$P\downarrow$, $M/P\uparrow$, $i\downarrow$, $I\uparrow$, $NX\uparrow$, $Y^{ad}\uparrow$, $Y\uparrow$

Shift in *AD*

$M\uparrow$, $M/P\uparrow$, $i\downarrow$, $I\uparrow$, $NX\uparrow$, $Y^{ad}\uparrow$, $Y\uparrow$
$\Rightarrow AD$ shifts right

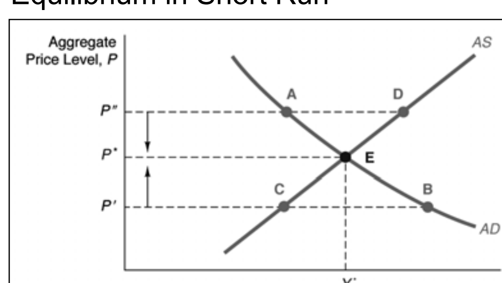
$C\uparrow$ or $G\uparrow$ or T$\downarrow$ or $NX\uparrow$: $Y^{ad}\uparrow$, $Y\uparrow$
$\Rightarrow AD$ shifts right

Complete Crowding Out

$G\uparrow$, borrowing, $i\uparrow \Rightarrow C\downarrow$, $I\downarrow$, $NX\downarrow \Rightarrow$ $C + I + G + NX = Y^{ad}$ unchanged

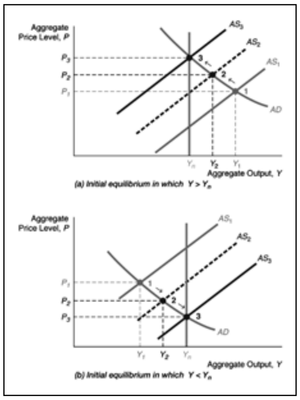
Partial crowding out: private spending down, but not fully offsetting $G\uparrow$

Equilibrium in Short Run



Equilibrium: $AD = AS$
If $P > P^*$, $AS > AD \Rightarrow P\downarrow$ to P^*
If $P < P^*$, $AS < AD \Rightarrow P\uparrow$ to P^*

Equilibrium in Long Run



Panel (a): $Y > Y_n$
Wages ↑: at given P, profits ↓, Y produced ↓ ⇒ AS shifts in until $Y = Y_n$ at long-run AS

Panel (b): $Y < Y_n$
Wages ↓: at given P, profits ↑, Y produced ↑ ⇒ AS shifts out until $Y = Y_n$ at long-run AS

Activist sees movement to long-run *AS* (self-correcting mechanism) as slow; nonactivist sees as fast

SUMMARY Table 1 Factors That Shift the Aggregate Demand Curve

Factor	Change	Shift in the Aggregate Demand Curve
Money supply M	↑	$AD_1 \rightarrow AD_2$
Government spending G	↑	$AD_1 \rightarrow AD_2$
Taxes T	negative	$AD_2 \leftarrow AD_1$
Net exports NX	↑	$AD_1 \rightarrow AD_2$
Consumer optimism C	↑	$AD_1 \rightarrow AD_2$
Business optimism I	↑	$AD_1 \rightarrow AD_2$

Note: Only increases (↑) in the factors are shown. The effect of decreases in the factors would be the opposite of those indicated in the "Shift" column. Note that monetarists view only the money supply as an important cause of shifts in the aggregate demand curve.

Summary: Factors that Shift *AS*

SUMMARY Table 2 Factors That Shift the Aggregate Supply Curve

Factor	Shifts in the Aggregate Supply Curve	Factor	Shifts in the Aggregate Supply Curve
$Y > Y_n$	$AS_2 \leftarrow AS_1$	Wage push	$AS_2 \leftarrow AS_1$
$Y < Y_n$	$AS_1 \rightarrow AS_2$	Positive supply shock	$AS_1 \rightarrow AS_2$
Rise in expected price level	$AS_2 \leftarrow AS_1$	Negative supply shock	$AS_2 \leftarrow AS_1$

CHAPTER 26

Transmission Mechanisms of Monetary Policy:
The Evidence

Two Types of Empirical Evidence

Structural Model Evidence (Keynesians)
$M \longrightarrow i \rightarrow I \longrightarrow Y$
Reduced Form Evidence (Monetarists)
$M \longrightarrow ? \longrightarrow Y$
Structural Model Evidence
Advantages:
1. Understand causation because more information on link between M and Y
2. Knowing how M affects Y helps prediction
3. Can predict effects of institutional changes that change link from M to Y *(e.g., regulation Q)*

Disadvantages:
1. Structural model may be wrong, negating all advantages

Reduced Form Evidence

Advantages:
1. No restrictions on how M affects Y: better able to find link from M to Y

Disadvantages:
1. Reverse causation possible
2. Third factor may produce correlation of M and Y

Early Keynesian Evidence

Evidence:

1. Great Depression: $i \downarrow$ on T-bonds to low levels $\Rightarrow$ monetary policy was "easy"
2. No statistical link from i to I
3. Surveys: no link from i to I

Objections to Keynesian evidence

Problems with structural model

1. i on T-bonds not representative during Depression: i very high on low-grade bonds: Figure 1 in Ch. 6
2. i_r more relevant than i: i_r high during Depression: Figure 1
3. $M^s \downarrow$ during Depression (Friedman and Schwartz): money "tight"
4. Wrong structural model to look at link of i and I, should look at i_r and I: evidence in 1 and 2 suspect

Early Monetarist Evidence

Monetarist evidence is reduced form

Evidence: Timing, Statistical and Historical

Monetary Transmission Mechanisms

Traditional Interest-Rate Channels

$M\uparrow, i_r\downarrow, I\uparrow, Y\uparrow$

$M\uparrow, P^e\uparrow, \pi^e\uparrow, i_r\downarrow, I\uparrow, Y\uparrow$

Other Asset Price Channels

International Trade

$M\uparrow, i\downarrow, E\downarrow, NX\uparrow, Y\uparrow$

Tobin's q

$M\uparrow, P_s\uparrow, q\uparrow, I\uparrow, Y\uparrow$

Wealth Effects

$M\uparrow, P_s\uparrow, W\uparrow, C\uparrow, Y\uparrow$

Credit View

Bank Lending

$M\uparrow$, deposits $\uparrow$, bank loans $\uparrow$, $I\uparrow$, $Y\uparrow$

Balance-Sheet

$M\uparrow$, $P_e\uparrow$, adverse selection $\downarrow$, moral hazard $\downarrow$, lending $\uparrow$, $I\uparrow$, $Y\uparrow$

Cash Flow

$M\uparrow$, $i\downarrow$, cash flow $\uparrow$, adverse selection $\downarrow$, moral hazard $\downarrow$, lending $\uparrow$, $I\uparrow$, $Y\uparrow$

Unanticipated Price Level

$M\uparrow$, unanticipated $P\uparrow$, adverse selection $\downarrow$, moral hazard $\downarrow$, lending $\uparrow$, $I\uparrow$, $Y\uparrow$

Liquidity Effects

$M\uparrow$, $P_e\uparrow$, value of financial assets $\uparrow$, likelihood of financial distress $\downarrow$, consumer durable and housing expenditure $\uparrow$, $Y\uparrow$

Lessons for Monetary Policy

1. Dangerous to associate easing or tightening with fall or rise in nominal interest rates.
2. Other asset prices besides short-term debt have information about stance of monetary policy.
3. Monetary policy effective in reviving economy even if short-term interest rates near zero.
4. Avoiding unanticipated fluctuations in price level important: rationale for price stability objective.